



# Transportation Synthesis Report

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## Policy Options for Troubled Drainage Areas

*Prepared for*  
**Bureau of Highway Development  
Division of Transportation Infrastructure Development**

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*Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WisDOT technical staff in highway development, construction and operations. Online and print sources include NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs, and related academic and industry research.*

### **REQUEST FOR REPORT**

WisDOT occasionally becomes involved in building a new highway, or adding lanes to an existing highway, in areas that are already prone to flooding due to natural conditions and/or a prior lack of attention to appropriate drainage. BHD is interested in knowing if other states have established policies for such “troubled areas” that give guidance as to the degree of flood mitigation efforts the DOT should take. The RD& T Program was asked to identify triggers for a DOT assuming some responsibility, suggested alternative mitigation efforts, cooperation strategies with local and regional authorities, etc.

### **BACKGROUND**

Development and application of state drainage policy are governed by federal, state, and local laws and regulations, some of which are unique to each state (e.g., Wisconsin’s constitution and public trust doctrine, WI DNR’s new wetlands regulations). There are also site-specific considerations (e.g., whether or not the project is located in a floodplain or coastal zone management area or governed by existing NPDES/stormwater permits). The state drainage manuals listed below contain specific modeling techniques and design criteria to be used, including mitigation techniques. In addition, FHWA regulations and guidance may limit application of state drainage policies when federal funds are used.

### **SUMMARY**

A search of major transportation and environmental Web sites, databases and state DOT resources turned up several references in state and federal documents that appear to be pertinent to “troubled” drainage areas. We provide brief comments on, and links to, drainage policies of North Carolina, Minnesota, New York, New Jersey and Virginia. We also reference AASHTO and FHWA guidance documents.

### **STATE GUIDELINES**

#### **North Carolina**

*General Drainage Policies and Practices*, North Carolina Department of Transportation  
<http://www.doh.dot.state.nc.us/preconstruct/highway/hydro/gl0399web/ii.gendrainpoli.html>

The North Carolina DOT Division of Highways relies on the Rule of Reasonable Use with respect to surface water drainage policy. The rule, formally adopted by the North Carolina Supreme Court, “allows each landowner to make reasonable use of his land even though by doing so, he alters in some way the flow of surface water thereby harming other landowners, liability being incurred only when this harmful interference is found to be unreasonable and causes substantial damage.”

Thus the North Carolina DOT's policy is "to develop and make reasonable use of its lands and rights of way through sound, reasonable and acceptable engineering practices and to **deny responsibility for augmented or accelerated flow caused by its improvements unless determined to cause unreasonable and substantial damages**. It is likewise the policy of the Division of Highways to expect this same practice and acceptance of responsibility by other property owners and those engaged in the development of these properties."

**Improvements and Maintenance of Drainage Outside the Right-of-Way.** "While it is the responsibility of the Division of Highways to provide for adequate drainage for constructing and maintaining the State Highway System, it is not its policy nor responsibility to provide improved drainage for the general area traversed by such roads, unless incidental to the drainage of the road or highway itself. **Drainage involvement outside the highway rights of way is limited to two general areas of justification:**

- Sufficient benefit could be gained by such action to warrant the cost. These benefits would be in such areas as reduction in roadway flood frequency or extent, facilitation of maintenance, or a reduction in potential damages.
- Work is required to correct a problem or condition created by some action of the Division of Highways.

It is not the responsibility of the Division of Highways to eliminate flooding on private property that is not attributable to acts of the agency or its representative."

### **Minnesota**

***Road Design Manual***, Minnesota Department of Transportation

<http://www.dot.state.mn.us/tecsup/rdm/>

The Minnesota DOT Road Design Manual is available at this site in both English and metric units. Chapter 8, "Drainage Design and Erosion Control" details the guidelines applicable for designers, including a helpful overview of drainage law. Chapter 8 (metric version) is directly available at

<http://www.dot.state.mn.us/tecsup/rdm/metric/8m.pdf>

Some relevant technical memoranda, including guidelines on Army Corps, NPDES, and stormwater permitting issues are available under MN/DOT technical memoranda, which are indexed at

<http://www.dot.state.mn.us/tecsup/tmemo/index.html>

Minnesota's Cost Participation Guidelines for joint construction projects with municipalities were originally to be revised as detailed in the drainage portion of the PowerPoint presentation at

<http://www.oim.dot.state.mn.us/projects/99costpart/PPT/tsld019.htm>

However, it does not appear that the 1993 technical memorandum (93-24-ES-02) was indeed revised, and instead it is listed as being merely "expired." See

<http://www.dot.state.mn.us/tecsup/tmemo/historic/h1993.html>

***State Aid Manual: Drainage***, Minnesota Department of Transportation

<http://www.dot.state.mn.us/stateaid/manual60.html>

The Minnesota State Aid Manual does contain policies for state and federal aid projects (including trunk highways) specifying who should pay for oversizing drainage systems, easements, eliminating any new drainage onto state highways, and referencing pertinent sections of state and federal laws and permits that must be considered.

### **New York**

***Highway Design Manual: Chapter 8 - Drainage***, New York Department of Transportation

[http://www.dot.state.ny.us/cmb/consult/hdmfiles/chapt\\_08.pdf](http://www.dot.state.ny.us/cmb/consult/hdmfiles/chapt_08.pdf)

This document provides a clear overview of New York's policies regarding purchasing of easements, applicable guidance and reference documents, as well as New York's regulatory and legal framework for drainage design decision-making.

## **New Jersey**

**Roadway Design Manual**, New Jersey Department of Transportation

<http://www.state.nj.us/transportation/cpm/RoadwayDesignManualMetric/sect10M2001.htm#DRAINAGE%20POLICY>

New Jersey DOT's general policy is that no additional flooding shall result outside DOT property or acquired easements. The design manual specifies relevant policies and regulations applicable to New Jersey highway construction, including allowable water surface areas (AWS) by types of structure (e.g., for roads, a minimum of 300 mm below the top of a grate or manhole rim for storm sewers) and flood recurrence levels based on types of structures (e.g., any drainage structure that passes water under a freeway or interstate highway embankment, with a headwall or open end at each side of the roadway is designed with a 50 year flood recurrence level). The AWS must comply with [New Jersey Department of Environmental Protection](#) requirements for locations that require a stream encroachment permit. The AWS upstream of a proposed drainage facility at locations that do not require a stream encroachment permit should not cause additional flooding outside the DOT property or acquired easements. The manual also specifies types of hydrology methods for computing the design peak flow, based on the size of the drainage area.

## **Virginia**

**Drainage Manual**, Virginia Department of Transportation

<http://www.extranet.vdot.state.va.us/locdes/drainage/START%20VDOT%20Drainage%20Manual.pdf>

This manual contains an interesting discussion of drainage "policy" versus "criteria," the responsibilities of the designer, and applicable laws (including a section regarding treatment of subdivisions).

## **NATIONAL DIRECTIVES & GUIDELINES**

**AASHTO Subcommittee on Design - Task Force on Hydrology and Hydraulics**

[http://www.transportation.org/committee/design/tf\\_hydrology.html](http://www.transportation.org/committee/design/tf_hydrology.html)

The existing AASHTO *Highway Drainage Guidelines* and *Model Drainage Manual* are undergoing revision and are expected to be reissued in 2003. The contractor for NCHRP project 15-23 is providing assistance to this Task Force. The AASHTO Liaison to the task force is Jim McDonnell 202-624-5448 or [jimm@ashto.org](mailto:jimm@ashto.org).

**NCHRP Web Doc 16 Improved Surface Drainage of Pavements: Final Report (1998)**

<http://books.nap.edu/books/nch016/html/117.html>

This document provides guidance in modeling improved surface drainage.

**FHWA Summary of Federal Highway Administration's Drainage Efforts**

<http://www.fhwa.dot.gov/pavement/drain.htm>

This Web page summarizes FHWA's work on drainage research and training modeling from the pavement infrastructure perspective.

**Federal-Aid Policy Guide on Storm Drainage Responsibility (NS 23 CFR 650A)**

<http://www.fhwa.dot.gov/legisregs/directives/fapg/0650asu1.htm>

This 1992 guidance document indicates that where facilities are in existence that convey storm water to the highway either by surface drainage or by existing storm drains, the highway agency is believed responsible for providing drainage on and across the right of way. The facilities for this drainage should avoid diversion and concentrations of water as much as possible. Drainage designs should be adequate and provide for increased runoff from developments within the drainage areas for 20 years hence.

If the municipality requests additional main drains or outlet sewers beyond the needs and responsibilities of the highway project, then the cost of providing this betterment should be borne by the municipality.

In locations where municipalities wish to drain additional areas into the highway system to avoid constructing a separate system or for some other reason, costs should be shared on an equitable basis. Such cooperative projects are believed desirable, but an agreement should be drawn up stating clearly the responsibilities of each agency involved.

- (a) One method to prorate cost is in proportion to the storm water supplied to the proposed facility. This should be done using the same frequency of runoff for all areas considered, unless a control for regulating is possible.

- (b) In cooperating with local municipalities, the highway agencies should guard against permitting overloading of the drainage system on or near the highway with the resulting hazard of damage by floods.